Wireless Pneumatic Thermostat (WPT) Overview

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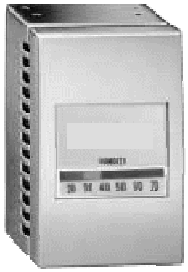
ENVIROSYSTEMS

Wireless Pneumatic Thermostat (WPT)

EXISTING LEGACY STAT



- Manual Setpoint Control
- No Remote Readings
- No Diagnostics
- Manual Calibration Required
- Cannot support Demand Response strategies

DDC in 20 Minutes!

WIRELESS PNEUMATIC THERMOSTAT

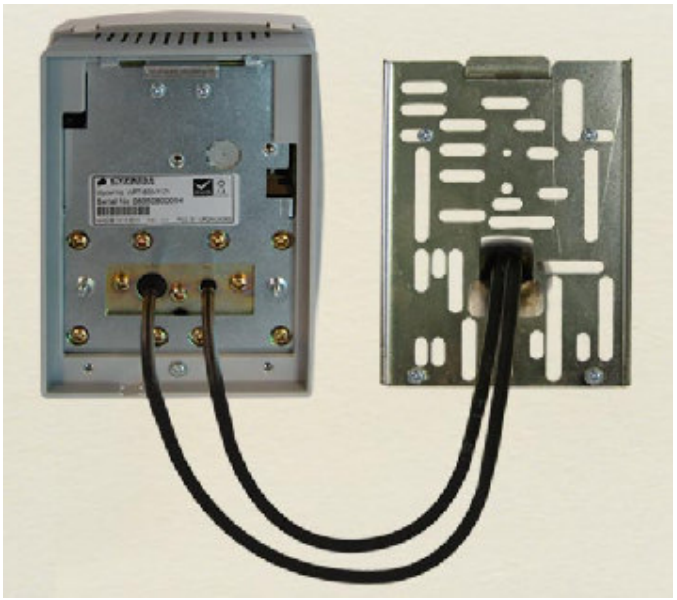
- Remote Wireless Setpoint Control
- Remote Monitoring of Temperature & Pressure
- Pager/Cell Notification of Excursions
- Automatic Self-calibration
- Programmable Temperature Setbacks
- Occupancy Override
- Enables Demand Response strategies
- BACnet Interface to BMS
- Compatible With Existing Johnson, Honeywell, Siemens, Robertshaw
- Up to 2yr battery life

Get the benefits of Direct Digital Control (DDC) in less than 20 minutes

Directly Replaces Existing Thermostats

- Directly replaces most existing pneumatic thermostats from Honeywell, Johnson Controls, Siemens, Robertshaw etc.

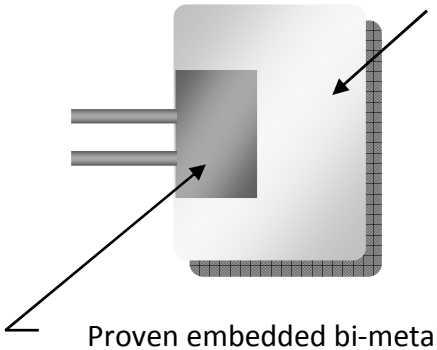
- Comes with a universal wall mounting bracket, and connects to existing main and branch pipes in minutes.



Proven Wireless + Pneumatic Technology

- Uses proven pneumatic bi-metallic strip technology for room temperature control
- We added advanced electronics to remotely control setpoint, and monitor temperature, branch pressure, and battery status
- If battery fails and electronics stop working, unit will function just like a traditional pneumatic stat

US & Int'l Patents Pending



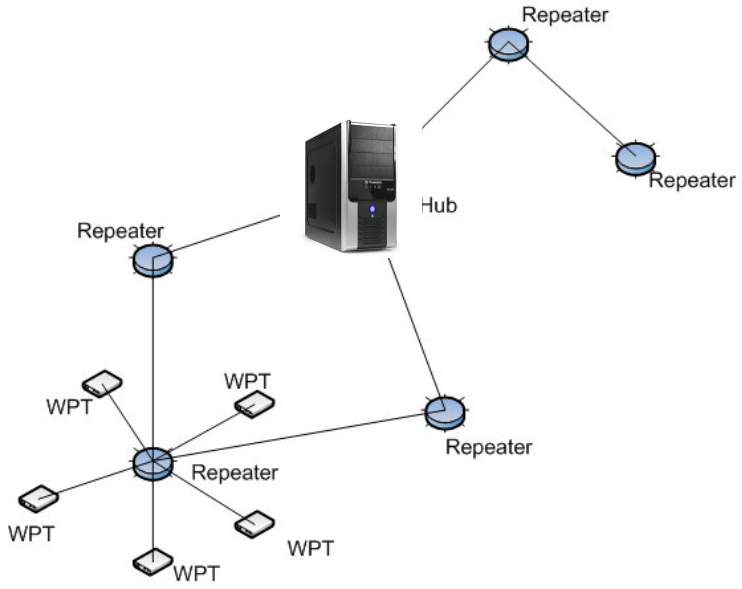
Advanced digital electronics for wireless control, monitoring and diagnostics.

Proven embedded bi-metallic strip technology for room temperature control

Three Year Battery Life

Wireless Mesh Communications

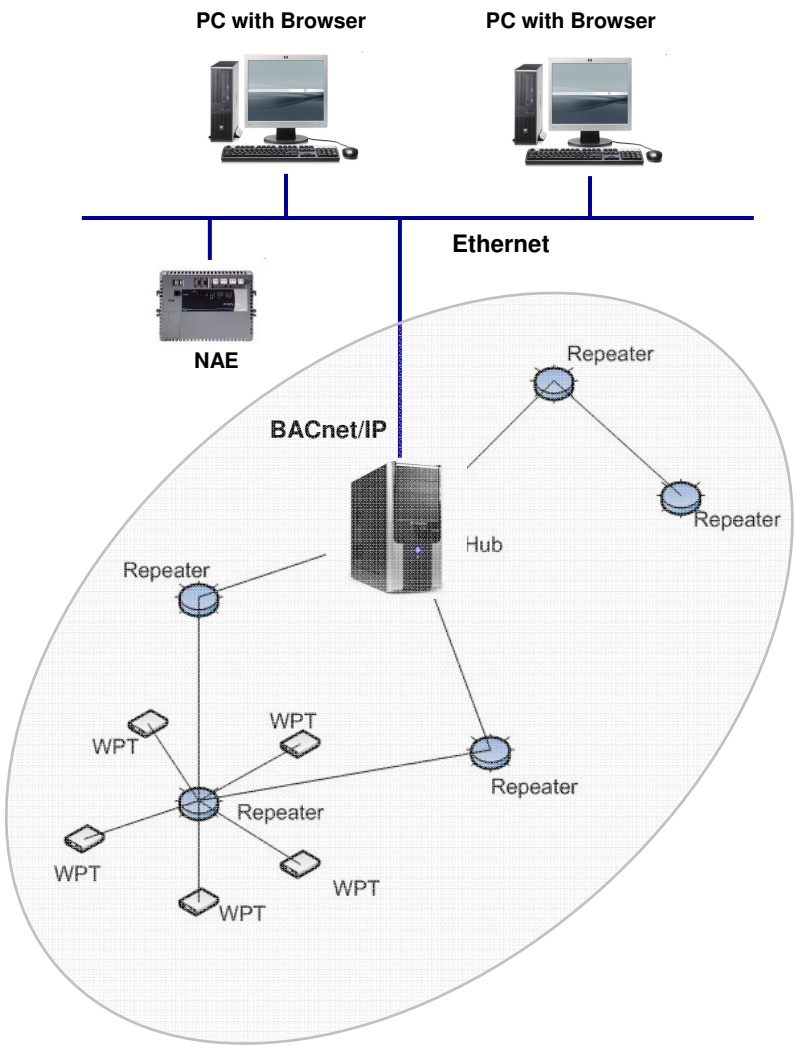
- Hybrid mesh wireless architecture provides coverage for most buildings and industrial sites – already in use by many Fortune 500 customers
- Up to 250 WPT's supported per Hub



2.4 GHz DSSS radios, +20dBm (100mW) peak output power

User Interface and Connectivity via BACnet

- The WPT Hub has a built-in web based user interface for configuration and basic operations
- The WPT Hub may also be connected to existing automation systems via BACnet/IP using a simple CAT 5 Ethernet cable
- BACnet compatible devices (e.g. JCI NAE) can gather data points and control setpoints, and provide a user interface
- Users do not need a separate operator station or learn a new interface.



BACnet Compatibility Testing

VENDOR	BAS	TEST PARTNER	LOCATION
ALERTON	BACtalk	Syserco	Fremont, CA
AUTOMATEDLOGIC CORPORATION	ALC	ACCO Engineered Systems	San Leandro, CA
Honeywell	Excel - EBI	Honeywell Corp.	Golden Valley, MN Wixom, MI
Johnson Controls	Metasys	RSD-Total Control JCI Sensor Products	San Jose, CA Milwaukee, WI
SIEMENS	Apogee	Siemens Building Technologies	Hayward, CA
t.a.c by Schneider Electric	Andover Continuum	EMCOR Integrated Solutions	Pleasanton, CA
TRANE	Trane Tracer Summit BCU	Trane	Calgary, Alberta - Canada
Delta CONTROLS	ORCA	Cypress Semiconductor	San Jose, CA

WPT – Reducing Energy Use & Improving Productivity

Savings Type	*Typical Reduction per 1200 sq-ft Zone*	*Annual Savings per 1,200 sq-ft zone*	*Comments*
Reduced Energy Cost			
Improved Calibration	1% to 5%	$17 to $83	Typical pneumatic thermostat is out of calibration in under 6 months
Programmable Zone Control, Night Setback	5% to 15%	$83 to $248	2% per every degree F of setback general rule
Lower Tariffs - Demand Response	0% to 3%	$0 to $50	Utility Demand Response program for electricity
Reduced Maintenance Labor			
Fewer tenant complaints/calls	0.0 man-hrs to 1.0 man-hrs	$0 to $85	Average 0 to 2 calls per year per thermostat
Reduce Calibration work	0.1 man-hrs to 0.5 man-hrs	$9 to $43	Average 20 minutes for calibration per year per thermostat
Reduce Troubleshooting	0.1 man-hrs to 0.2 man-hrs	$9 to $17	Average 10 minutes for troubleshooting per year per thermostat
Lower Tenant Related Costs			
Better occupancy overide cost recovery		$5 to $50	Enable tenant zone override with automatic tracking
Improvement in lease retention rate	5% to 10%	$60 to $120	Happier tenants (tenant turnover cost $10 per sq-ft)
TOTAL		**$175 to $700**	

Source: US Energy Information Administration (2003 - 2007), ASHRAE, Cypress Envirosystems customer surveys

Annual savings of up to $700 per year per Thermostat – typical payback in less than one year

How Does This Compare with Alternatives?

BENEFITS

- Retrofit in minutes
- No disruption of tenants
- Can implement zone-by-zone (vs. all at once)
- No running wires
- No PLC's, Controllers, I/O cards
- No drawings and approvals
- No replacing actuators
- Works with existing Building Automation Systems
- Minimal retraining of staff

COMPARISON WITH DDC

	Wireless Pneumatic Thermostat	Direct Digital Control Retrofit
Thermostat	$370	$75
Controllers, Actuators, I/O	$30	$750
Install/Wiring Labor	$100	$1,000
Drawings, Reviews	$0	$200
Tenant Disruption	$0	$300
Total Cost (per point)	$500	$2,325

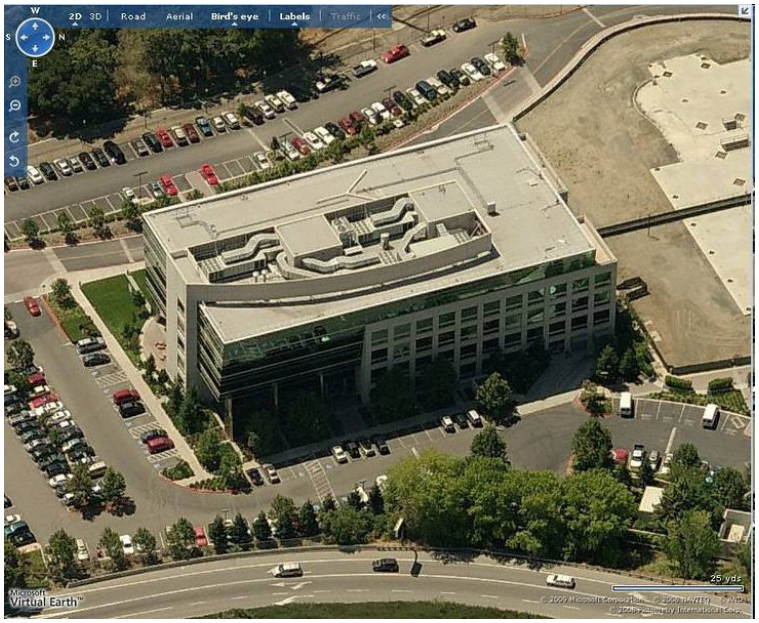
Note: Estimates for typical 100 zone system

About 80% Lower Cost than DDC, and 80 Times Faster to Install

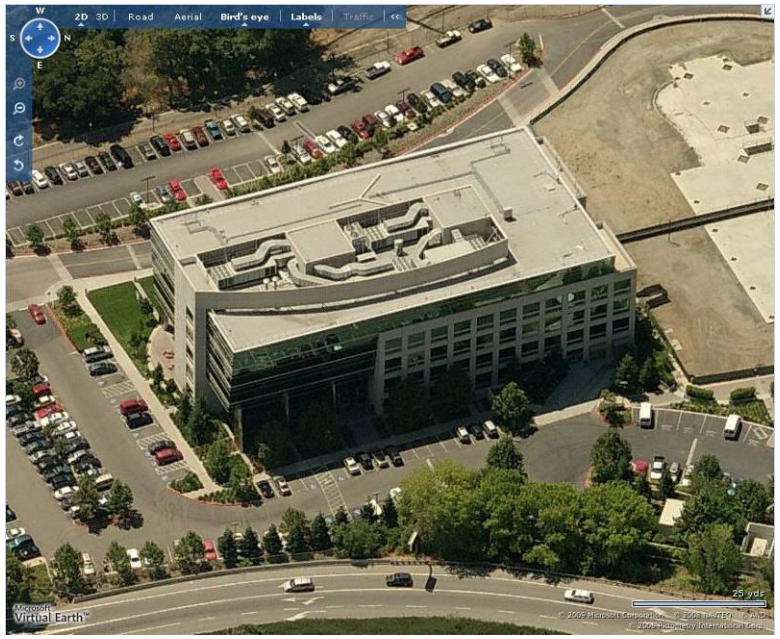
Sample WPT Projects

Installed August 2008

Installation February 2009

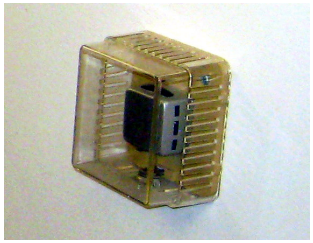


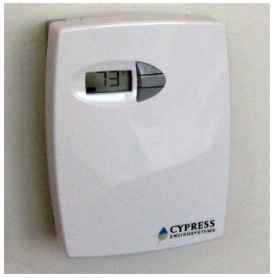
Enabling Smart Grid – Auto Demand Response



- County of Santa Clara, Social Services Administration
- 2 Buildings, each 5 story, built 2000
- Total 300,000 sq-ft
- 350 Pneumatic Thermostats, non-communicating
- Estimated Demand Response load shed: 200kW
- Would like to participate in PG&E Auto-DR program, but challenging with pneumatic thermostats

15 Minute Replacement of Thermostat





80% Lower Cost, 5% of the Time vs. Conventional DDC

Santa Clara County Government Project

	Cypress Envirosystems Wireless Pneumatic Thermostats Retrofit	Conventional Direct Digital Control Retrofit
Installed Price	350 x $500 = $175,000	350 x $2,500 = $875,000
Time Required	8 days	6 months
Disruption to Operations	Minimal	Significant
Potential Exposure to Toxic Substances in Walls	None	Unknown
Paid for by PG&E Auto DR Incentive	100% covered	31% covered

"Installation took only eight days and was one of the easiest, fast and most cost effective energy efficiency improvements we have ever made in our buildings"
- Jeff Draper, Manager of Building Operations

Regulation Drivers in California

- **Default Critical Peak Pricing**
  - Starting May 1st, 2010, virtually all commercial office building customers will move to a default electricity pricing rate called Critical Peak Pricing www.pge.com/mybusiness/energysavingsrebates/demandresponse/cpp/
  - This rate structure provides for discounted rates when no CPP events are called. However, on CPP event days, higher "critical peak" energy charges will be assessed for usage between noon and 6pm.
  - Customers are notified by PG&E by 3pm the day prior to the critical event.
  - Customers with Auto-Demand Response enabled buildings (e.g. communicating thermostats, lighting etc.) can automatically reduce usage using these high rate periods to avoid high charges.
- **Assembly Bill 1103 – Building Energy Efficiency Disclosure**
  - Starting January 1, 2010, all commercial building lease transactions must disclose the energy efficiency history and Energy Star rating of the facility. More efficient buildings will be able to attract premium tenants, and potentially command a rental premium.

Source: California Public Utilities Commission Decision, July 31st, 2008 (see page 21 and Attachment B)
http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/85984.pdf

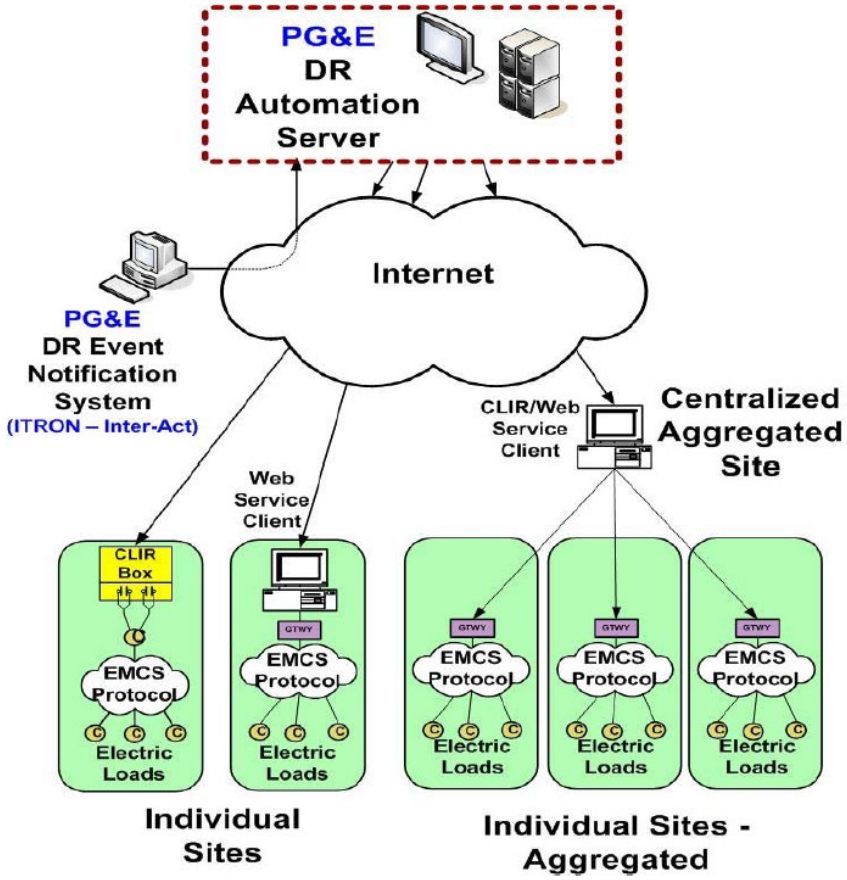
LEED Credits

LEED for Existing Buildings: Operations & Maintenance
Registered Project Checklist

			Energy & Atmosphere, continued			
			Existing Building Commissioning			
			Credit 2.1	**Investigation and Analysis**	✓	2
			Credit 2.2	**Implementation**	✓	2
			Credit 2.3	**Ongoing Commissioning**	✓	2
			Performance Measurement			
			Credit 3.1	**Building Automation System**	✓	1
			Credit 3.2-3.3	**System Level Metering**		1 to 2
				Credit 3.2 40% Metered		1
				Credit 3.3 80% Metered		2

Utility Demand Response Integration

- Communications link technology developed by Lawrence Berkeley National Labs.
- PG&E Technical Incentive:
  - $200/kW for equipment and installation
  - $40/kW for participant incentive
  - $60/kW for Technical Coordinator
- Funding approved by PUC
- Average power switched by one WPT => 2kW to 5kW. Up to 100% of cost eligible for rebate!



Compatibility Testing Completed with Lawrence Berkeley National Labs

Selected Customers